
NEW *THELYPTERIS* (THELYPTERIDACEAE) FROM CENTRAL AMERICA

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ABSTRACT

Studies on *Thelypteris* (Thelypteridaceae) for *Flora Mesoamericana* have revealed the following eight new species, which are herein described: *Thelypteris aureola*, *T. barvae*, *T. chiriquiana*, *T. croatii*, *T. grayumii*, *T. longisora*, *T. redunca*, and *T. subscandens*.

***Thelypteris* (subg. *Goniopteris*) *aureola* A. R. Smith, sp. nov.** TYPE: Honduras. Yoro: Río Pelo, Cordillera de Mico Quemado, 60–380 m, 19 Mar. 1923, *Ames 136* (holotype, US). Figure 1D–E.

Ex affinitate *T. praetermissae* (Maxon) A. R. Smith, *T. nicaraguensis* (Fourn.) C. Morton, et specierum affinium glandibus stipitatis aureis vel auriantiacis abaxialiter abundantibus in axibus laminis sorisque distinguenda.

Rhizome not known, probably creeping; fronds 65 cm; petiole 32 cm × 3 mm; lamina 32 cm, with a conform apical pinna; buds lacking; pinnae 11 pairs, to 15 × 2.5 cm, incised ca. 2/3 their width, proximal ones abruptly narrowed but still lobed at their base; segments 4–5 mm wide, contiguous, suboblique and subfalcate; veins ca. 15 pairs per segment, proximal 2 pairs from adjacent segments connivent at sinus; indument abaxially on rachis, costae, veins, and laminar tissue of abundant golden or orangish, short-stipitate glands 0.1 mm, also with acicular hairs to 1 mm and stellate or furcate hairs less than 0.1 mm on costae and rachis, adaxially the laminar tissue with scattered sessile or short-stipitate glands; sori subcostular, exindusiate; sporangia and receptacle with numerous short-stipitate golden or orangish glands.

Known only from the type.

The lamina color in *T. aureola* is lighter, yellow-green than in closely related species. Pubescence on the costae abaxially, a mixture of short, simple and furcate hairs less than 0.1 mm and stout simple hairs greater than 0.5 mm, suggests affinity with *T. praetermissa* (Maxon) A. R. Smith. Other close relatives include *T. minor* (C. Chr.) A. R. Smith and *T. nicaraguensis* (Fourn.) C. Morton. However, all of these are eglandular (as are most other members of subg. *Goniopteris*), in stark contrast to the copiously stipitate-glandular

lamina of *T. aureola*. A few other species of *Thelypteris* apparently have entirely glandular variants in an otherwise hairy species, e.g., in *T. (Meniscium) longifolia* (Desv.) R. Tryon, and it is possible that this transformation is under simple genetic control. Nevertheless, it is a very striking and unusual feature and instantly makes the species recognizable.

***Thelypteris* (subg. *Amauropelta*) *barvae* A. R. Smith, sp. nov.** TYPE: Costa Rica. Heredia: along Río San Rafael, Atlantic slope of Volcán Barva, 10°13'N, 84°05'W, 12 Apr. 1986, *Grayum 7012* (holotype, UC; isotype, MO). Figure 2A–C.

Thelypteris jimenezii affinis, a qua imprimis differt pinnis reductis basi laminae paucioribus (ca. 4-jugatis), segmentis latioribus sinibus angustioribus, textura crassiore, lamina abaxialiter parce pilosa, soris suboblongis.

Rhizome erect; fronds ca. 60 cm; stipe 13 cm × 2–3 mm, at base with numerous, ovate, persistent, shiny scales, these glabrous or with adpressed hairs 0.2–0.3 mm on surface; lamina ca. 45 cm, proximally with 4 pairs of subabruptly reduced pinnae, lowermost ca. 1 cm; pinnae opposite or subopposite, ca. 17 pairs, to 8 × 1.8 cm, incised to ca. 1.5–2 mm from costa; aerophores lacking; segments 5 mm wide; veins 6–7 pairs per segment; indument abaxially on rachis, costae, and costules of adpressed hairs 0.2–0.3 mm, laminar tissue abaxially glabrous or with a very few similar adpressed hairs; sori oblong or elongate along distal third of veins, exindusiate.

Known only from the type, in primary forest in low, damp places.

Perhaps most closely related to *T. jimenezii* (Maxon & C. Chr.) C. Reed but differing by having broader segments with narrower sinuses, thicker

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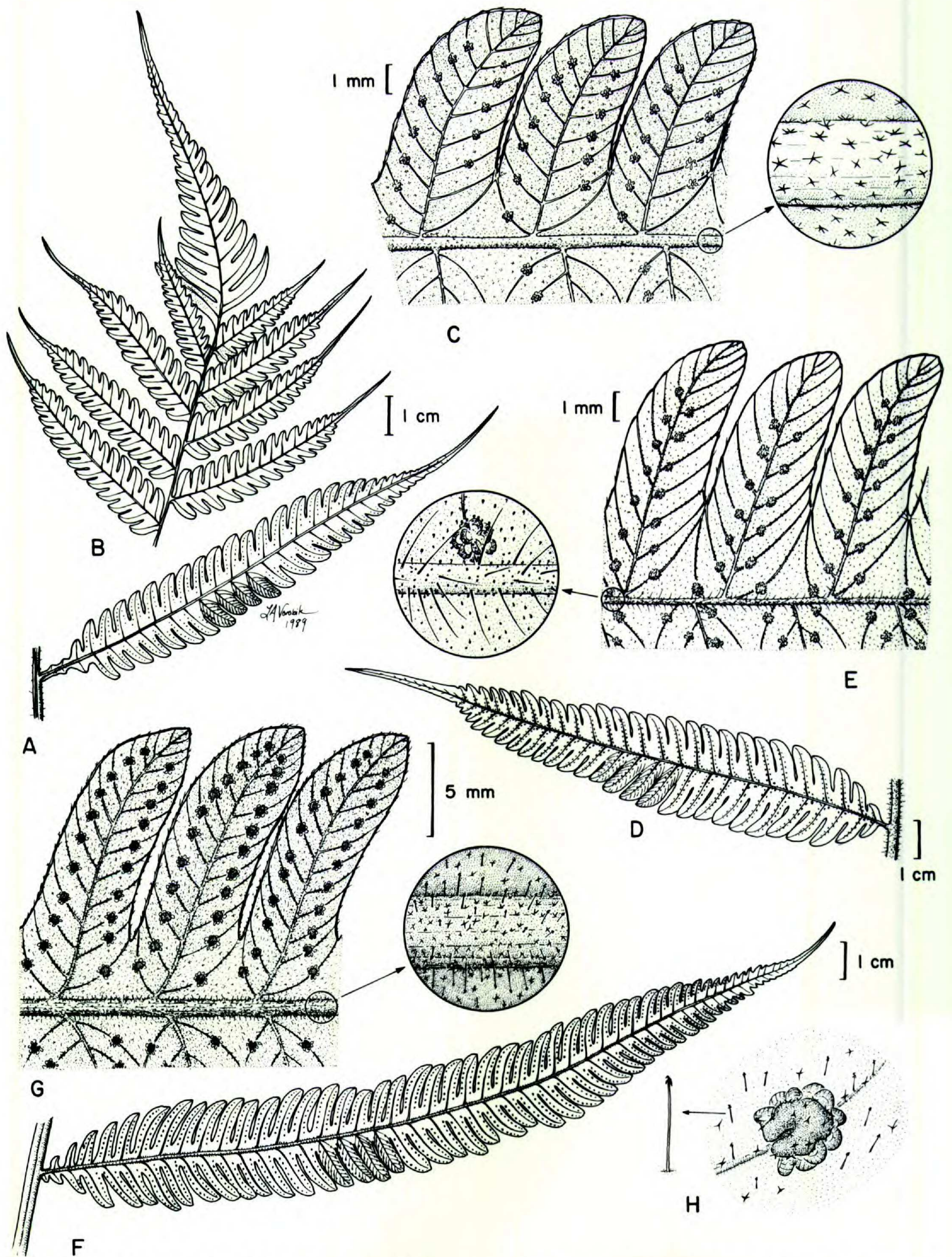


FIGURE 1. New species of *Thelypteris*. A-C. *Thelypteris croatii* (Croat 21951 UC).—A. Proximal pinna.—B. Lamina apex.—C. Ultimate segments, with detail of hairs. D-E. *Thelypteris aureola* (Ames 136 US).—D. Proximal pinna.—E. Ultimate segments, with detail of hairs and laminar glands. F-H. *Thelypteris redunca* (Croat & Hannon 64239 UC).—F. Proximal pinna.—G. Ultimate segments, with detail of hairs.—H. Sorus.

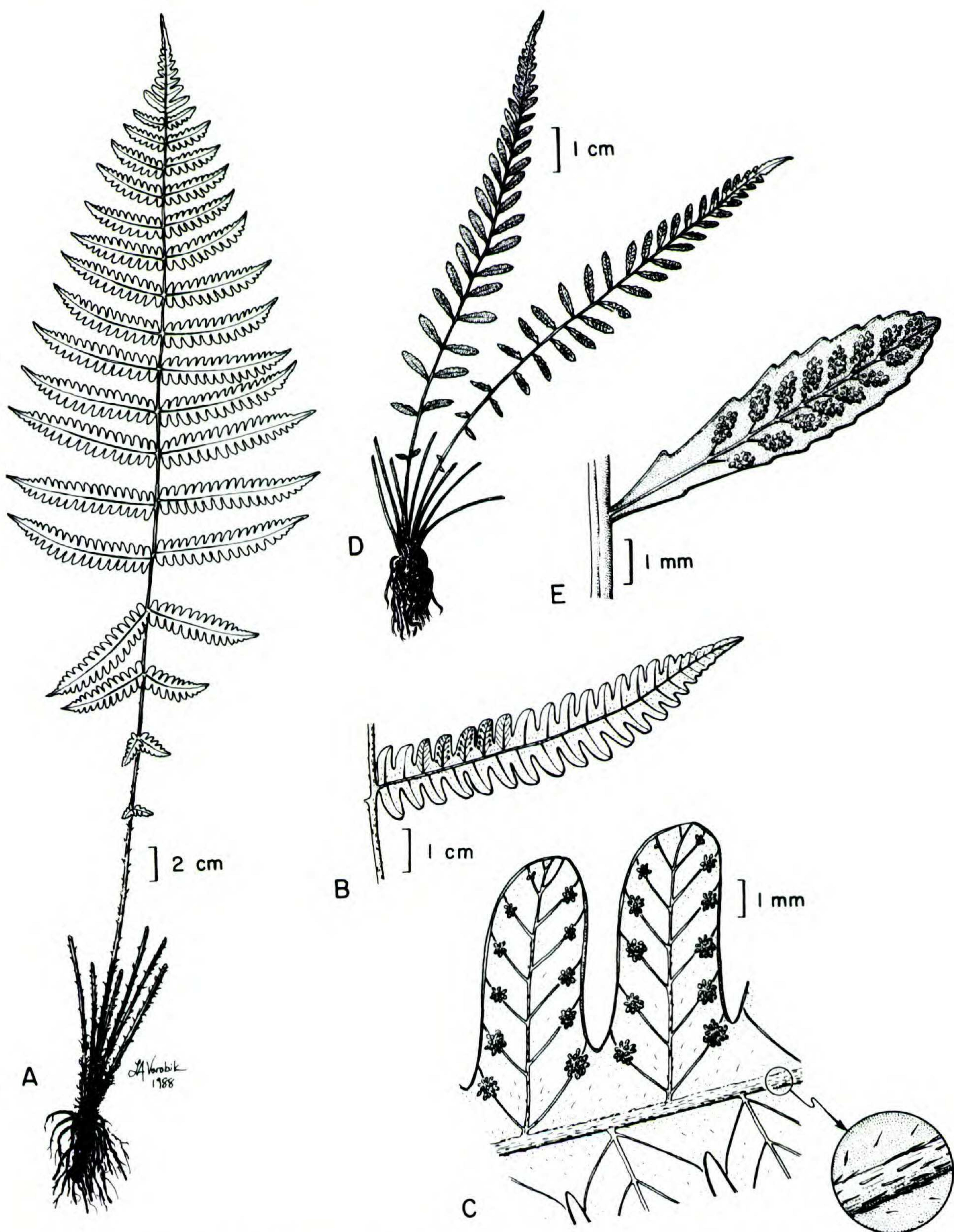


FIGURE 2. New species of *Thelypteris*. A–C. *Thelypteris barvae* (Grayum 7012 UC).—A. Habit—B. Medial pinna.—C. Ultimate segments, with detail of hairs. D–E. *Thelypteris grayumii* (Haber ex Bello & Lierheimer 4532 MO).—D. Habit.—E. Medial pinna.

lamina, laminar tissue glabrous abaxially and only sparingly hairy adaxially, elongate sori, and fewer reduced pinna pairs. In blade cutting, it greatly resembles certain species of sect. *Uncinella*, e.g., *T. atrovirens*, but hamate hairs are entirely lacking.

Thelypteris* (subg. *Amauropelta*) *chiriquiana
A. R. Smith, sp. nov. TYPE: Panama. Chiriquí:
Distrito Bugaba, Cerro Punta, from STRI house

to edge of mountain across river, 8°52'N, 82°33'E, 2,200 m, 24 Jan. 1985, *van der Werff & Herrera 6319* (holotype, UC; isotype, MO not seen). Figure 3A–C.

Species indusiis amplis persistentibus fuscatis, pinnis subinaequilateris, stipitibus nitentibus, atropurpureis vel nigrescentibus, lamina eglandulosa et sparsim pilosa, rhizomate longo erecto gracili a congeneribus diversa.

Rhizome erect, caudex to 10 × 1 cm; fronds to 80 cm; petiole to ca. 15 cm × 2 mm, purple-

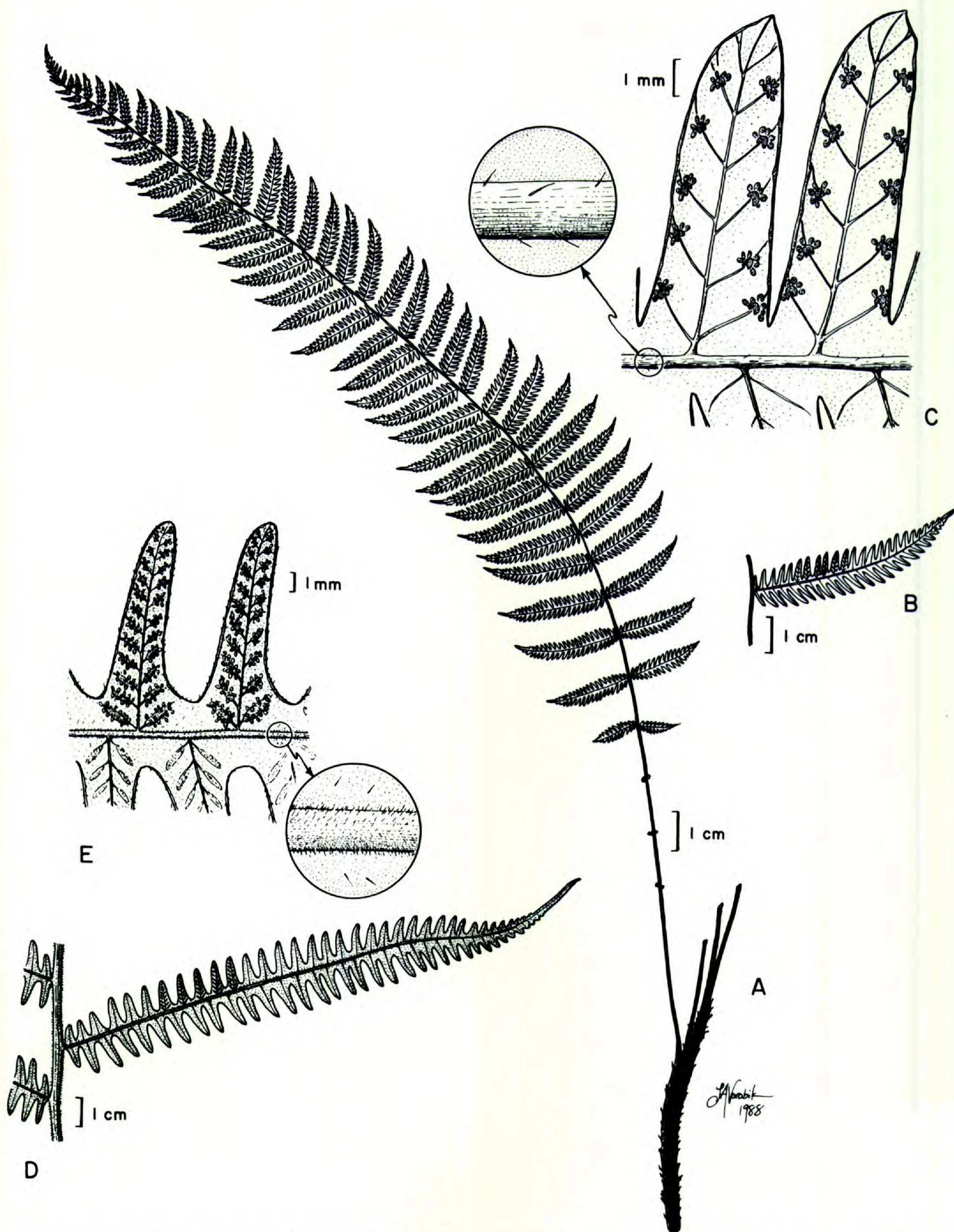


FIGURE 3. New Species of *Thelypteris*. A-C. *Thelypteris chiriquiana* (van der Werff & Herrera 6319 UC).—A. Habit.—B. Medial pinna.—C. Ultimate segments, with detail of hairs. D-E. *Thelypteris longisora* (van der Werff & Herrera 6375 UC).—D. Proximal pinna.—E. Ultimate segments, with detail of hairs.

black, shining, glabrous or with sparse hairs 0.1–0.2 mm, at base with castaneous, shining, glabrous scales to 5×1.5 mm; lamina to ca. 70 cm, proximally with ca. 6 pairs of subabruptly reduced pinnae, lowermost vestigial; pinnae to 6×1.5 cm,

slightly inequilateral with segments on basiscopic side shorter and more oblique; aerophores absent or very weakly developed; segments ca. 3 mm wide; veins to 6 pairs per segment; indument abaxially lacking or of sparse hairs 0.1–0.2 mm on costae,

laminar tissue glabrous on both sides or sparsely short-hairy adaxially; sori medial to supramedial; indusium tan to dark brown, persistent, glabrous.

Known only from the type, from cloud forest.

Affinities of this species are uncertain. In the relatively large, darkened indusium and slightly inequilateral pinnae, it resembles *T. cinerea* (Sodi-ro) A. R. Smith but differs by having shining, purplish black stipe, eglandular lamina, and long, slender, erect rhizome.

The specimen *van der Werff & Herrera 6455* (UC), from the same area as the type, is similar but differs in the more numerous hairs on rachis and costae abaxially; scattered castaneous, linear scales to 0.5 mm on costae abaxially; tuberculiform aerophores; ciliolate indusia; and creeping to ultimately suberect rhizome. These differences may be sufficient to recognize it as a different species, but more material is needed. The two are more closely related to each other than to other *Thelypteris*.

Thelypteris (subg. *Goniopteris*) ***croatii*** A. R. Smith, sp. nov. TYPE: Panama. Chiriquí: Burica Peninsula, Rabo de Puerco, 8 km W of Puerto Armuelles, 50–150 m, 18 Feb. 1973, *Croat 21951* (holotype, UC; isotype, MO). Figure 1A–C.

Ex affinitate *T. biolleyi* (Christ) Proctor et specierum affinium pilis ancyriforibus carentibus, venis infimis ad sinum conniventibus, basi pinnarum infimarum peranguste cuneata distincta; a *T. nephrodioides* (Klotzsch) Proctor soris exindusiatis vel indusiis minutis dignoscenda.

Rhizome erect; fronds ca. 1 m; stipe ca. 45–60 cm; lamina 50 cm, with a confluent, pinnatifid apex; buds lacking; pinnae ca. 20–25 pairs, to ca. 15 × 2.5 cm, incised ca. $\frac{3}{4}$ – $\frac{1}{5}$ their width, proximal ones abruptly narrowed toward their long-cuneate base; segments ca. 4–6 mm wide; veins ca. 10–13 pairs per segment, proximal pair from adjacent segments connivent at sinus, rarely united below sinus; indument abaxially on rachis, costae, and veins entirely of sessile stellate hairs 0.1 mm, laminar tissue verrucose, with appressed stellate hairs on both sides, adaxially the veins with curved acicular hairs on costules; sori exindusiate or with an indusial fragment; sporangia with sessile stellate and simple hairs.

Paratypes. COSTA RICA. PUNTARENAS: between Las Cruces Botanical Garden and Río Jaba, ca. 3 km SE of San Vito de Coto Brus, 8°47'N, 82°58'W, 1,050–1,200 m, *Grayum 5606* (MO); San José: 13 km SW of San Isidro on road to Dominical, 800 m, 10 Aug. 1967, *Lellinger 878* (MO, US not seen). PANAMA. CHIRIQUÍ: along road from Puerto Armuelles to San Bartolo Limite,

7 mi. W of Puerto Armuelles, ca. 120 m, 19 May 1976, *Croat 35064* (MO).

This belongs to the group of *T. biolleyi* (Christ) Proctor but differs in the complete absence of anchor-shaped hairs and in the lowermost pair of veins connivent at the sinus, occasionally united below the sinus. From *T. nephrodioides* (Klotzsch) Proctor, *T. croatii* differs in being exindusiate or with only a minute fragmentary indusium. From both it differs in the narrowly cuneate pinna bases.

Thelypteris (subg. *Amauropelta*) ***grayumii*** A. R. Smith, sp. nov. TYPE: Costa Rica. Heredia: along Río San Rafael, Atlantic slope of Volcán Barva, 10°13'N, 84°05'W, 1,500 m, 12 Apr. 1986, *Grayum 7042* (holotype, UC; isotype, MO not seen). Figure 2D–E.

Thelypteris villanae affinis, a qua imprimis differt pinnis infimis 1–2 paribus pinnarum aliquantum reductarum, 3–5 mm longis (non valde reductis), basi stipitum exsquammatis, pinnis integris vel crenulatis, ascendentibus, basin versus cuneatis.

Rhizome suberect; fronds 5–15 cm, fasciculate; stipe up to 2 cm × 0.7 mm, tan to brownish, glabrous; lamina to ca. 13 cm, proximally with 1 or 2 pairs of slightly shortened pinnae, lowermost ca. 3–5 mm long, distally the lamina pinnatifid and somewhat attenuate; pinnae alternate, often strongly ascending, up to ca. 15 pairs, up to 10 × 2.5 mm, narrowed at the base, entire to crenulate, sometimes with a single acroscopic, nearly free basal lobe; aerophores lacking; veins simple from the costae, up to ca. 10 pairs per pinna; indument completely lacking on both sides of lamina; sori oblong or elongate along the proximal $\frac{1}{2}$ – $\frac{2}{3}$ of the veins, exindusiate.

Paratype. COSTA RICA. PUNTARENAS: Monteverde Cloud Forest Reserve, road to TV towers, 10°20'N, 84°50'W, 1,600 m, 23 Apr. 1986, *Haber ex Bello & Lierheimer 4542* (MO).

This is probably most closely related to *T. villana* L. D. Gómez, from which it differs in fronds lacking strongly reduced proximal pinnae (2–4 pairs reduced in *T. villana*, the lowest ca. 1 mm long), in the completely glabrous stipe (scaly stipe bases in *T. villana*) in the more ascending pinnae that are narrowed at the base, and in growing at higher elevations (200–1,100 m for *T. villana*). The holotype was noted as growing on mossy boulders in a river.

The species is named for its collector, Dr. Michael Grayum, who brought it to my attention as possibly new, and who has made many important collections of and observations on Costa Rican pteridophytes.

Thelypteris (subg. *Amauropelta*) **longisora** A. R. Smith, sp. nov. TYPE: Panama. Chiriquí: Distrito Bugaba, Cerro Punta, from STRI house to nearby ridge, 2,200 m, 8°52'N, 82°33'W, 25 Jan. 1984, *van der Werff & Herrera 6375* (holotype, UC; isotype, MO not seen). Figure 3D–E.

Species soris elongatis secus venas, frondibus ad 2 m longis, pinnis profunde incisis, sinubus inter segmenta latis, pilis hamatis carentibus, abaxialiter squamis appressis amorphis secus costas a congeneribus diversa.

Rhizome erect; fronds to 2 m; stipe length unknown, 5+ mm diam.; lamina to ca. 1.5 m, proximally with 5+ pairs of abruptly reduced pinnae, lowermost vestigial; pinnae 30 pairs or more, to 20 × 3 cm, incised within 1 mm of costa; aerophores lacking or tuberculiform; segments to 5 mm wide, sinuses very broad; veins to 20 pairs per segment; indument abaxially of dense, short hairs 0.1 mm long on rachis, costae, and costules, also with a few appressed amorphous costal scales (irregular in shape and lacking obvious cell definition) to 1 mm, lamina adaxially with spreading slightly reddish hairs 0.2–0.3 mm; sori linear, running along half to nearly the entire length of veins, confluent and completely obscuring the lamina at maturity; exindusiate.

Known with certainty only from the type, from cloud forest.

In the flora area, only *T. linkiana* (C. Presl) R. Tryon and *T. atrovirens* (C. Chr.) C. Reed have the sori so elongate along the veins, but these species both bear hamate hairs on the axes abaxially. Other characters distinguishing *T. longisora* are the very broad sinuses between segments, deeply incised pinnae, fronds to 2 m with widely spaced pinnae, and appressed, amorphous scales on the costae abaxially.

The specimen *Smith et al. 2446* (UC), from the same general area as the type, is nearly identical in lamina dissection and sorus shape but differs in the costae and rachis abaxially lacking hairs and having more numerous costal scales.

Thelypteris (subg. *Goniopteris*) **redunca** A. R. Smith, sp. nov. TYPE: Honduras. Olancho: along Río Olancho, on road between San Francisco de la Paz and Gualaco, 13.6 mi. SW of Gualaco, 15°00'N, 86°07'W, 1,300 m, 6 Feb. 1987, *Croat & Hannon 64239* (holotype, UC; isotype, MO not seen). Figure 1F–H.

Thelypteris biolleyi affinis, a qua imprimis differt venis infimis ad sinum margine attingentibus, pinnis profunde incisis, indusiis magnis persistentibus rufo-brunneis, pilis abaxialiter ancyrififormibus et densioribus ad laminam venasque.

Rhizome apparently short-creeping; fronds ca. 140 cm; petiole ca. 70 cm × 5 mm; lamina ca. 70 cm, gradually narrowed distally to a confluent, pinnatifid apex; buds lacking; pinnae ca. 20 pairs, to 22 × 3 cm, deeply incised to within 2 mm of costa, basal segments of proximal pinnae free or nearly so, reduced; segments 4–5 mm wide, acutish at apex, subfalcate; veins to ca. 15 pairs per segment, proximal pair from adjacent segments meeting margin at or just above sinus; indument abaxially of dense anchor-shaped hairs 0.2–0.3 mm and stellate hairs on costae, veins, and laminar tissue, adaxially with appressed stellate hairs; sori with a large, reddish brown indusium, this stellate-hairy; sporangia glabrous.

Known only from the type.

This is most closely related to *T. biolleyi* (Christ) Proctor but differs in having the lowermost pair of veins meeting the margin at the sinus; deeply incised pinnae; large, persistent, reddish brown indusia; and denser covering of anchor-shaped hairs on the lamina and veins abaxially. Another close relative, *T. nephrodioides* (Klotzsch) Proctor, differs in lacking anchor-shaped hairs and in being less deeply incised. *Thelypteris croatii* differs in lacking anchor-shaped hairs and in being nearly or quite exindusiate.

Thelypteris (subg. *Amauropelta*) **subscandens**

A. R. Smith, sp. nov. TYPE: Costa Rica. Heredia: N end of Cerros Las Marías, N slope of Volcán Barva, 10°10.5'N, 84°06.5'W, 2,100–2,380 m, 19 Apr. 1986, *Grayum 7273* (holotype, UC; isotype, MO not seen). Figure 4.

Species rhizomate scandenti, ad 1 m × 4 mm, rhachidi costis costulisque abaxialiter pilis hamatis 0.2–0.3 mm praeditis, lamina adaxialiter pilis adpressis carenti, costis abaxialiter squamis parvis castaneis praeditis, indusiis persistentibus, 0.7–1.0 mm, atrocastaneis vel nigrescentibus epilosis a congeneribus diversa.

Rhizome prostrate to subscandent (erect on smaller plants), to 1 m × 4 mm, bearing ovate to ovate-lanceolate, castaneous, glabrous, shining scales 2–3 × 1–1.5 mm; fronds ca. 75 cm; stipe to ca. 15 cm × 2–3 mm, dark brown at base, with numerous hairs 0.1–0.3 mm, these slightly reddish, often ± appressed; lamina to ca. 60 cm, proximally with ca. 4 pairs of abruptly reduced pinnae, lowermost ca. 1 mm; pinnae alternate, ca. 30 pairs, to 10 × 2.2 cm, deeply incised to within 0.5 mm of costa; aerophores lacking; segments ca. 3 mm wide, suboblique, margin entire to crenulate; veins to ca. 10 pairs per segment; indument abaxially on rachis, costae, and costules of spreading, hamate hairs 0.2–0.3 mm, laminar tissue glabrous

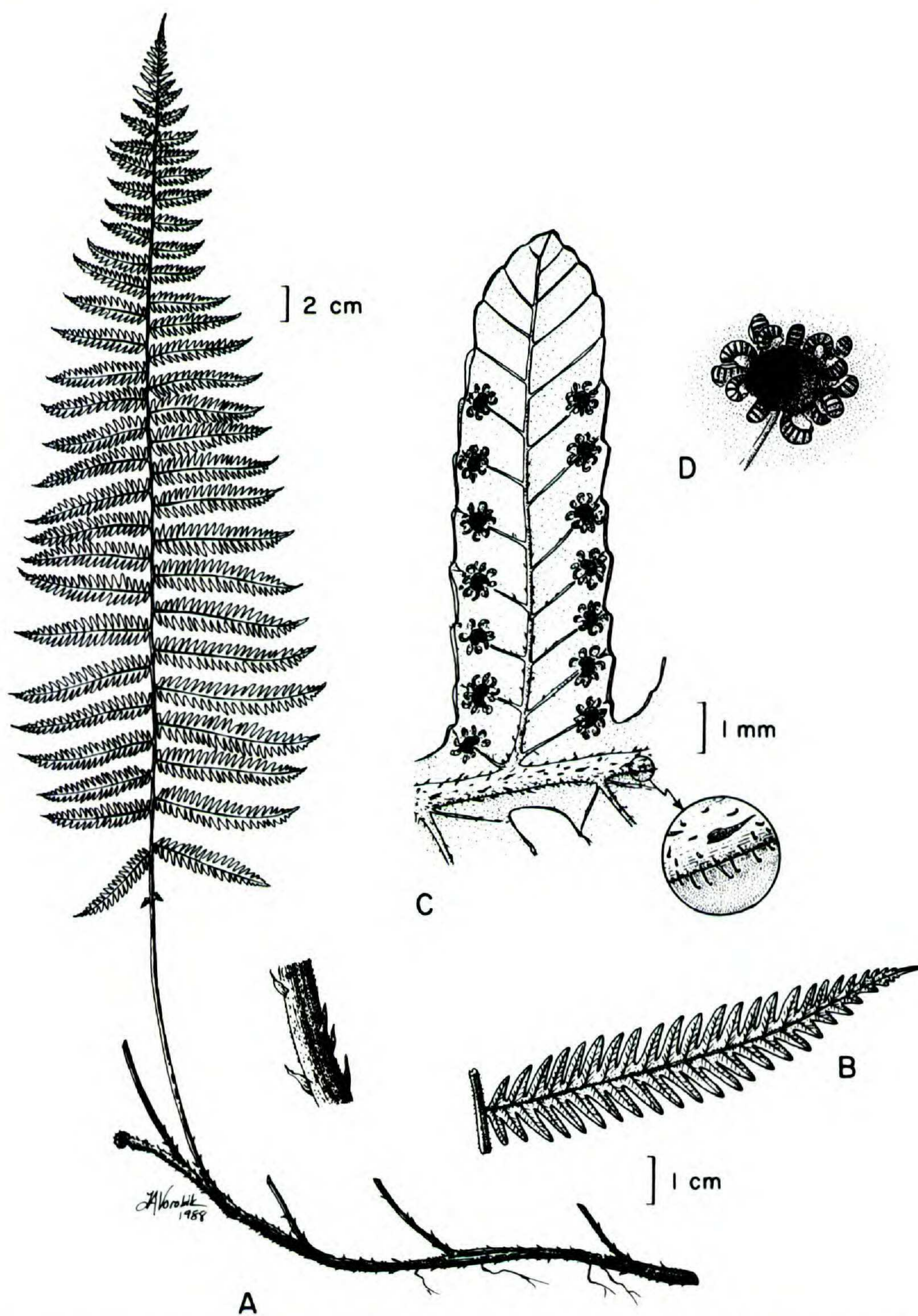


FIGURE 4. *Thelypteris subscandens* (Grayum 7273 UC).—A. Habit.—B. Medial pinna.—C. Ultimate segments, with detail of hairs.—D. Sorus.

or nearly so on both sides; sori round, supramedial, with a relatively large, persistent indusium ca. 0.7–1.0 mm diam., this dark-castaneous to blackish with a very narrow tan margin, minutely glandular at the margin, epilose.

Known only from the type, from cloud forest on ridge.

The hamate hairs suggest that this species be-

longs to sect. *Uncinella*. However, *T. subscandens* differs remarkably from all known members of the section by the scandent rhizome. Also, it lacks adpressed hairs on the lamina adaxially, a character found in most other members of the section. In addition, it bears small castaneous scales on the costae abaxially. In sum, it is one of the more distinctive species in the section, perhaps in all of the subgenus, and close relatives are not apparent.